

**REMARKS/ARGUMENTS**

Reconsideration of the application as amended is respectfully requested.

**Status of Claims**

Claims 1, 2 and 4-27 are pending in the application, with claim 1 being the only independent claim and claims 4-13 and 20-22 being withdrawn from consideration. Claims 1, 2 and 4-27 have been amended.

**Overview of the Office Action**

Claims 1, 2, 14-19 and 23-27 stand rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.

Claims 1, 2, 14-19, 23 and 26 stand rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,494,955 (*Lei*).

Claims 1, 2, 14-19, 23 and 26 stand rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,001,183 (*Gurary*).

Claims 1, 2, 14-19, 23 and 26 stand rejected under 35 U.S.C. 103(a) as being unpatentable over *Gurary* in view of *Lei*.

Claims 24 and 25 stand rejected under 35 U.S.C. 103(a) as being unpatentable over *Gurary* or *Lei* in view of U.S. Patent No. 6,063,203 (*Satoh*).

Claim 27 stands rejected under 35 U.S.C. 103(a) as being unpatentable over *Gurary* or *Lei* in view of U.S. Patent No. 6,454,865 (*Goodman*).

**Amendments Addressing the 35 U.S.C. 112 Rejection**

Claims 1, 2, 14-19 and 23-27 stand rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. Claim 1 recites the limitation “wherein the support step is configured to support the substrate so that a bottom surface of the substrate is disposed lower than an edge area of the substrate holder and a top surface of the substrate is disposed higher than said edge area”. In the Examiner’s opinion, there is no requirement of the type claimed in the specification.

Applicants respectfully disagree.

This limitation is clearly shown in Figs. 6C, 8A and 8B. Original drawings are part of the original disclosure (*see* MPEP 608.04(a)). Moreover, paragraph [0040] of the specification explicitly states that “although the substrate 2 is located deeper than the edge area of the substrate holder 1, the substrate surface nevertheless projects from the edge area of the substrate holder 1” (emphasis added). Thus, this limitation is clearly supported by the original disclosure. To address the Examiner’s concern, applicants have amended paragraph [0040] of the specification to provide an almost exact antecedent basis for the claim limitation. The amendment to the specification does not add new matter.

In view of the above explanation and amendment, withdrawal of the rejection under 35 U.S.C. 112, first paragraph, of claims 1, 2, 14-19 and 23-27 is respectfully requested.

**Summary of Subject Matter Disclosed in the Specification**

The following descriptive details are based on the specification. They are provided only for the convenience of the Examiner as part of the discussion presented herein, and are not intended to argue limitations which are unclaimed.

The present specification discloses an assembly for a facility for epitaxial deposition of semiconductor material. The inventors recognized a problem associated with the effect in homogeneity of the substrate surface temperatures on the emission wavelength of deposited semiconductor material (see paragraph [0006] of the specification of filed) the invention have designed a substrate holder assembly which alleviates or at least minimizes this problem. The assembly includes a substrate 2 for the epitaxial deposition of semiconductor material. The substrate 2 has a pre-determined thickness. The assembly further includes a substrate holder 1. The substrate holder 1 includes a substrate supporting face having a support step 5, a holder rear face, which faces away from the substrate supporting face, and a temperature equalization structure which results in a defined temperature profile over the entire substrate surface of the substrate 2. The substrate 2 is located on or in the vicinity of the substrate holder 1 during the epitaxial deposition. *See* Figs. 8A and 8B; and paragraphs [0008], [0042] and [0043] of the specification.

The temperature equalization structure comprises a stepped relief which is formed on the substrate supporting face of the substrate holder 1. The support step 5 is configured to support the substrate 2 so that a bottom surface of the substrate 2 is disposed lower than an edge area of the substrate holder and a top surface of the substrate 2 is disposed higher than said edge area. *See* Figs. 6C, 8A and 8B; and paragraphs [0017], [0040], [0042] and [0043] of the specification.

### **Allowability of the Claims**

#### **Independent Claim 1**

##### *Comments Regarding Relative Dimensions*

In the rejection of claim 1, the Examiner refers to *Gardner v. TEC Systems, Inc.*, 220 USPQ 777 (Fed. Cir. 1984), and alleges that the only difference between the prior art and claim 1 was a recitation of relative dimensions of the claimed substrate holder and a device having the claimed relative dimensions would not perform differently than the prior art device.

Independent claim 1 is now amended to recite an assembly including a substrate and a substrate holder. As such, the substrate is part of the claimed assembly. Therefore, it is believed that the *Gardner v. TEC Systems, Inc.* line of reasoning is no longer applicable to amended claim 1.

*35 U.S.C. 103(a) Rejection as Unpatentable over Lei:*

Amended claim 1 recite, *inter alia*, the following:

“a substrate...having a pre-determined thickness;

a substrate holder comprising:

a substrate supporting face having a support step;

wherein the support step is configured to support the substrate so that a bottom surface of the substrate is disposed lower than an edge area of the substrate holder and a top surface of the substrate is disposed higher than said edge area” (emphasis added).

The above-quoted, last limitation of amended claim 1 does not define the height of a substrate. Rather, it defines the configuration of the support step of a substrate holder and a substrate having a pre-determined thickness.

Applicants respectfully submit that amended claim 1 is patentable over *Lei* because *Lei* fails to teach or suggest the above-quoted, last limitations of amended claim 1.

*Lei* relates to a substrate support assembly 138 which has a substrate support 202 and a stem 204. The substrate support 202 includes an upper plate 208 and a lower plate 210 which

supports the upper plate 208. The upper plate 208 and a plurality of posts 228A, 228B, 228C support a substrate 140 during processing. More specifically, the upper plate 208 includes a support surface 216 having a seal ring 218 which is used to support the substrate 140, and a stepped surface 220 which is disposed radially inside the seal ring 218. A shadow ring 258 is supported by the lower plate 210. *See* Fig. 2A, col. 3, lines 38-63, and col. 6, lines 38-42 of *Lei*.

Since the substrate 140 is placed directly on the seal ring 218 of the upper plate 208, the bottom surface of the substrate 140 is disposed coplanar with the seal ring 218. Thus, if the top of the seal ring 218 of the upper plate 208 in *Lei* is considered to be the edge area of the substrate support 202, then the substrate is arranged above the edge area. Moreover, it is noted that in *Lei* the top surface of the substrate 140 is disposed lower than the top surface 262 of the shadow ring 258 (*see* Fig. 2A of *Lei*). Therefore, if the top surface 262 of *Lei* is considered to be the edge area of the substrate support 202, then the substrate 140 is below the edge area. Thus, *Lei* fails to teach a substrate holder having a support step, wherein the support step is configured to support the substrate so that a bottom surface of the substrate is disposed lower than an edge area of the substrate holder and a top surface of the substrate is disposed higher than said edge area, as now expressly recited in amended claim 1 of the present application.

On page 3 of the Office Action, the Examiner contends that the principle of operation in *Lei* is same as in the claimed invention. Applicants respectfully submit this contention is incorrect because the principle of operation of *Lei* is substantially different from that of the claimed invention. As discussed earlier, in *Lei* the substrate 140 is supported by the stepped surface 220 and the plurality of posts 228A, 228B, 228C. In other words, *Lei* teaches using a different support arrangement to support the substrate 140. Thus, *Lei* fails to suggest the limitation “wherein the support step is configured to support the substrate so that a bottom

surface of the substrate is disposed lower than an edge area of the substrate holder and a top surface of the substrate is disposed higher than said edge area” of amended claim 1.

In view of the difference, withdrawal of the 35 U.S.C. 103(a) rejection of claim 1 as being unpatentable over *Lei* is respectfully requested.

*35 U.S.C. 103(a) Rejection as Unpatentable over Gurary:*

Amended claim 1 is also patentable over *Gurary* because *Gurary* fails to teach or suggest the above-quoted, last limitation of amended claim 1.

*Gurary* relates to a wafer carrier. More specifically, the wafer carrier 100, 200, 300, 400, 500, 600, 700, 800, 900, 1000, 1100, 1200, 1300 of *Gurary* is intended to be used with a conventional susceptor 110 in an epitaxial growth process (*see* Figs. 1-16 and col. 1, lines 9-15 of *Gurary*). Fourteen embodiments are disclosed in *Gurary* (*see* col. 4, line 24 to col. 5, line 45 of *Gurary*), and *Gurary* systematically discusses these embodiments in detail one by one (*see* col. 5, line 54 to col. 15, line 14 of *Gurary*).

However, in each of these embodiments, when a substrate wafer 140 is disposed in the wafer pocket 134, 234, 334, 434, 534, 634, 734, 834, 934, 1034, 1134, 1234, 1334, the top surface of the substrate wafer 140 is positioned no higher than an edge area of the wafer carrier 100, 200, 300, 400, 500, 600, 700, 800, 900, 1000, 1100, 1200, 1300 (*see* Figs. 1-16 of *Gurary*). Therefore, *Gurary* also fails to disclose or teach a substrate holder having a support step, wherein the support step is configured to support the substrate so that a bottom surface of the substrate is disposed lower than an edge area of the substrate holder and a top surface of the substrate is disposed higher than said edge area, as now expressly recited in amended claim 1.

*Gurary* actually explicitly teaches away from positioning the top surface of a substrate higher than an edge area of a substrate holder because *Gurary* explicitly teaches that the wafer pocket typically has a depth which is about 0.002 inches deeper than the thickness of the wafer (see col. 1, lines 60-63 of *Gurary*; noting this teaching is applicable to the embodiments of *Gurary* as well). In view of this explicit teaching away, there is no apparent reason for a person with ordinary skill in the art to change the wafer pocket depth of *Gurary* so that the top surface of the substrate is disposed higher than the edge area of the substrate holder. Therefore, like *Lei*, *Gurary* fails to teach or suggest the limitation “wherein the support step is configured to support the substrate so that a bottom surface of the substrate is disposed lower than an edge area of the substrate holder and a top surface of the substrate is disposed higher than said edge area” of amended claim 1.

The fact that something can be done is an insufficient basis to obviate an invention. Absent an apparent reason, the reference can be modified in the way proposed in the Office Action only with impermissible hindsight based on the claimed invention.

In view of the foregoing, withdrawal of the 35 U.S.C. 103(a) rejection of claim 1 as being unpatentable over *Gurary* is respectfully requested.

*35 U.S.C. 103(a) Rejection as Unpatentable over Gurary in view of Lei:*

Applicants respectfully submit that amended claim 1 is also patentable over *Gurary* in view of *Lei* because, as discussed in detail earlier, neither *Gurary* nor *Lei* teaches or suggests a substrate holder having a support step, wherein the support step is configured to support the substrate so that (1) "a bottom surface of the substrate is disposed lower than an edge area of the substrate holder" and (2) "a top surface of the substrate is disposed higher than said edge area",

as now recited in amended claim 1. Therefore, withdrawal of the 35 U.S.C. 103 rejection of claim 1 as being unpatentable over *Gurary* in view of *Lei* is deemed to be in order.

Dependent Claims 2, 14-19 and 23-27

Claims 2, 14-19 and 23-27 depend, either directly or indirectly, from independent claim 1 and, thus, each is deemed allowable therewith.

In addition, these claims include features which serve to still further distinguish the claimed invention over the prior art of record.


Conclusion

Based on all of the above, it is respectfully submitted that the present application is now in proper condition for allowance. Prompt and favorable action to this effect, and early passing of this application to issue, are respectfully solicited.

Should the Examiner have any comments, questions, suggestions or objections, he is respectfully requested to telephone the undersigned in order to facilitate early resolution of any outstanding issues.

Respectfully submitted,

COHEN PONTANI LIEBERMAN & PAVANE LLP

By  \_\_\_\_\_  
Alfred W. Froeblich  
Reg. No. 38,887  
551 Fifth Avenue, Suite 1210  
New York, New York 10176  
(212) 687-2770

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